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Official Organ of The American Electro Medical Society

\$3.00 per year, in advance.

The American X-Ray Publishing Co.

Masonic Temple, 55 State Street

CHICAGO, U. S. A.

IN THE TREATMENT OF

**ANÆMIA, NEURASTHENIA, BRONCHITIS, INFLUENZA,
PULMONARY TUBERCULOSIS, AND WASTING DISEASES OF
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THE AMERICAN X-RAY JOURNAL

PUBLISHED MONTHLY BY THE AMERICAN X-RAY PUBLISHING COMPANY.

55 State St., Masonic Temple 1207, Chicago, Ill.

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SUBSCRIPTION RATES—IN ADVANCE:

United States, Canada and Mexico.....	\$3.00	Foreign Countries.....	\$4.00
Single Copies.....	50	Single Copies.....	60

Contributions of Original articles and other matter relative to X-Radiance and Electrotherapy, of interest to the medical profession, are solicited from all parts of the world. Contributors will be furnished extra copies of the JOURNAL containing their articles at cost of publication.

Entered as Second-Class Matter, March 4, 1908, at the Postoffice at Chicago, Ill., under the Act of Congress of March 3, 1879.

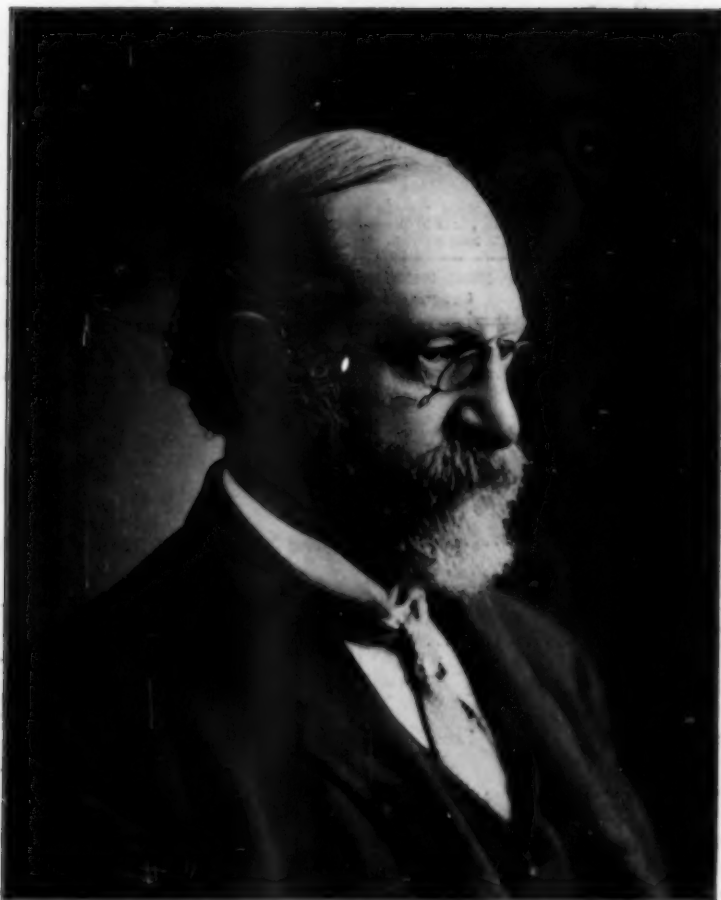
VOL. XIV.

CHICAGO, JUNE, 1904.

No. 6

CONTENTS.

	PAGE		PAGE
Frontispiece. Dr. Gilman	162	Psycho Therapy. By Henry W. Roby ...	181
The Rational Treatment of Malignancy.		EDITORIAL	183
By H. Preston Pratt	163	Correspondence	185
Causes and Forms of Treatment in		Medico Legal Aspect of X-Rays.....	186
Chronic Prostatitis. By F. A. Lens-		Electro Culture	188
man	166		
International Electrical Congress of St.		General Items—	
Louis	172	Warts and Moles.....	182
American Electro-Therapeutic Association	174	Government and Wireless Telegraphy	184
International Congress of Medicine at		New Form of X-Light Tube	185
Lisbon	176	New Theory of Polar Currents.....	191
Electrical Action in Plants and Animals.	177	Experts on Cancer	191
Effects of Different Lights Upon the		More Surprising Properties of N-Rays	192
Eye. By D. W. Weaver	179	Cancer Research Abandoned	192



DR. JOHN E. GILMAN.

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The Rational Treatment of Malignancy.

BY H. PRESTON PRATT, M. D., CHICAGO.

Dr. Roswell Park, in an address before the surgical society in Germany, is credited in the newspapers with saying that in America cancer is making such rapid headway that there are more deaths from this disease than from tuberculosis.

If this statement is true, and we have no reason to doubt it, as it comes from a surgeon of such excellent standing, who is certainly familiar with the statistics on the subject, it behooves the medical profession to awaken, broaden out, and follow up every new channel of scientific investigation until it has discovered a method which will decrease this mortality.

Surgery pure and simple has had its sway sufficiently long for us to realize that we can no longer expect much from that source, and we are all bound to admit that it has not materially decreased the mortality, but instead has often hastened death, and consequently should be either relegated to the background to enable science to develop a more rational method, or if used at all it should be used only as an adjunct treatment. This same opinion was expressed by the celebrated Dr. Agnew, who said, "I do not remember a single case of cancer operated on by me that was cured." At the meeting of the American Electro-Therapeutic Association in September, 1902, Dr. W. J. Morton incidentally read a quotation from a private letter, refraining, of course, from

giving the name of the surgeon, who, however, is one of the distinguished operators of New York City, which is as follows: "I am an absolute pessimist regarding the curability of such cases by surgical operation, and only operate with that motive in view out of deference to current surgical opinion. I have never seen, even after the most thoro operation, a single case of scirrhus of the breast with a cancerous axillary gland cured by excision." Even Dr. Robert Rayburn, the only surviving surgeon of those who attended Garfield in his last illness, made a similar statement before the same Association meeting at Atlantic City last September. He said in substance, "Every surgeon knows or ought to know that the knife does not cure cancer; it simply opens up the channels, allowing the infection to spread more rapidly; and we should seek other methods." So long as the knife continues to be used, so long we will be kept in ignorance of a more rational treatment. According to the writer's opinion the treatment should be directed towards closing the channels and limiting the area of infection; in other words, housing off the cancer from the rest of the body. When this is accomplished the knife can be safely used to remove the septic mass, thereby materially lessening the danger of recurrence.

Another once popular treatment, which

was used more extensively by quacks than any one else and which has a good many cures to its credit, is by escharotics, the use of arsenic preparations, zinc chlorid pastes, etc. These are used extensively on superficial malignant growths and invariably leave a scar.

Another treatment which has proven itself more efficient in superficial growths is the x-ray, and still a fourth treatment which has been looked upon with favor is the galvano-cautery knife.

The fifth and sixth treatments for superficial as well as deep cancer, and which have the greatest number of cures in their favor, are commonly known as the electrolytic or the Parsons, and the kataphoric or Massey methods.

The last or seventh method of treatment which I will refer to is a modification of the fifth and sixth methods, a method which in my opinion has greater possibilities than them all. This is a combination of either the Parsons or Massey and the writer's own method.

Without going into the pathology of cancer, permit me to say that almost all pathologists have agreed that cancer is of parasitic origin.

The most rational treatment, in my opinion, is to sterilize the tissues around the growth by mild currents of electricity, driving into the tissues oxygen and chlorin. This prepares the tissues to resist the encroachment of the cancer cell. After this, follow up by the Massey treatment, driving zinc and mercury into the tissues with heavy currents, thereby cutting off the circulation and at the same time destroying the cancer cells outright. For the superficial growth arsenic or other medicaments can be driven into the tissues by the kataphoric action of the x-ray with excellent results in some cases.

The cautery knife can be used sometimes to advantage, because it partially

closes the channels of infection, or in other words checks the infection if it has not already passed beyond the point subjected to the knife. If the infection has not gone too far a method which walls off or limits its area is the ideal one; then the knife or cautery knife can be used to advantage. A chemical analysis reveals of the same elements as a non-malignant the fact that a malignant cell is composed one, which would naturally suggest to an inquiring mind that perhaps the difference could be accounted for in the same manner as in the case of the isomeric carbohydrates whose molecules are identical in composition and weight, but differ in structure. The difference is due to the rearrangement of the elements in the molecules and cells and in their relations to the adjacent molecules and cells. To bring about a change in the structure of the cell would possibly mean converting a malignant cell into a non-malignant cell. This is probably what takes place when the Parsons, Massey or x-ray methods are used. The Parsons flash method consists of placing two electrodes, one from each pole of a battery, within a short distance of each other, and turning on and off the current of from 200 to 600 ma. The duration of flash is about twenty seconds in alternation. This brings about a change in the position of the elements comprising the cell, which in turn changes the character of nutrition of the cell.

Massey's kataphoric method consists in driving zinc and mercury into the tissues, producing a marked destruction of tissue near the electrode, and at the same time sterilizing the tissues for some distance beyond. The difference between the two methods is quite marked.

The methods which I have lately adopted and which have proven so far most satisfactory are as follows:

First, in treating superficial epithelioma

I use the x-ray alone or in combination with arsenic or zinc-chlorid paste. For cosmetic effect the x-ray alone is preferable. If the superficial epithelioma refuses to yield to the above treatment the writer sterilizes the outer border by driving oxygen and chlorin by kataforesis into the tissues with a mild current.

Secondly, for deep seated growths I sterilize the outer border of the growth first with mild currents, then follow up the treatment by driving zinc and mercury into the tissues. Not only does the positive pole dehydrate the tissues, but it restricts the circulation. The heavy currents sterilize the surrounding tissues and produce a decidedly destructive local effect.

It is a well known fact that when the negative pole is applied to a stricture a mild current will disintegrate it, thereby relaxing the surrounding tissues, while a much heavier current will produce an increased source of irritation and may make matters much worse. So far we use a very mild current to drive oxygen and chlorin into the tissues so that the channels will be thoroly sterilized before the introduction of the heavier currents, thus preventing contraction of the tissues. After the borders of the growth are thoroly sterilized and the center destroyed, it is safe to go in with a knife and excise the mass.

The report of a very interesting case treated in our laboratory I will give complete and let you judge for yourself.

Mr. A., of Nebraska, who was referred to this laboratory by Dr. H., had an extended epithelioma of the lower lip. He had consulted several skin specialists as

well as surgeons. They declared that the case was inoperable. They advised him to go home and make himself as comfortable as possible. Dr. H., who treated the case, used the x-ray for about nine months. For a while it seemed to improve. Then it began to increase in size. This was the condition when we commenced treatment. The first thing done was to apply preparations of arsenic and drive it into the tissues by the use of the x-ray, which was followed up for four months, daily treatment. Then we began to inject into the body of the tumor surrounding the tissues animal extracts, and used mild currents of electricity to hasten their absorption. Then the animal extracts were injected hypodermatically into the fleshy part of the lip. This treatment was followed up for about six weeks daily. After that he was placed under an anesthetic. Zinc and mercury were driven from the positive pole into the surrounding tissues, which not only dehydrated them, but at the same time cut off the circulation and they were destroyed to a great degree. After a period of about two weeks the infiltration at the angles of the jaw and glands had entirely disappeared. Then the knife was used to excise the mass. A letter from his physician a few days ago stated that the patient has fully recovered, gained eighteen pounds, and is happy. This treatment seemed to be a long one. Experience in similar cases has taught us that the full treatment could be completed within thirty days. I am of the opinion that if all these malignant cases were properly sterilized in a like manner before the knife was used we would be able to control a large per cent of them.

Causes and Forms of Treatment in Chronic Prostatitis.*

BY F. A. LEUSMAN, M. D., CHICAGO.

Gibbon amused himself for twenty years, so he says, writing his inimitable history of the decline and fall of the Roman Empire. Not being a Gibbon nor having his time, means, or powers of observation, I may be forgiven if my research is less exhaustive, my personal observations deficient, acuity of discernment and purity of style absent. But when we indulge in the superb privilege of reading Gibbon or history in general, it seems to me that economics will, in a practical way, be found to be the necessary foundation-stone to sustain the weight of whatever lofty superstructure we may direct our fancy to or execute with the arts at hand. It would seem that with some attention of a practical and scientific character given to the needs of the male and female human animal, a paper like the present one could not form even a subject for thot. But reason, scientific attainments, social life and economics are still in a state of evolution, and with it we have the question of prostatitis, this common but so frequently overlooked affection. Let us endeavor to find what are the causes, especially the common causes, which our daily practice with its inquiry into the habits of the patient (and sometimes of the doctor) would seem to demonstrate. There we notice that the prostate and its ills do not trouble its bearer until it has reached anatomical development and physiological needs. That means from the age of fifteen and upward until death or old age. There is no prostatitis in childhood. We further find that an individual with normal general as well as sexual habits, even if he reaches an age of eighty or more years, has no prostatic disease, no dreaded prostatic enlargement. Normal man with normal life knows no prostatic disease.

We will here exclude from study tuberculosis, syphilis, tumor, inherited constitutional diathesis, the sins of our fathers or mothers.

Well, what then leads to prostatitis? We answer, violation of the laws of nature, and, unfortunately, nature is a harsh and inexorable judge that exacts ever her dues, and yet we poor mortals never discover her intentions except by previously violating her rules; and even then nature does not speak in plain terms, but we must be content with inferences and deductions, *post hoc ergo propter hoc* conclusions. That is the layman's reasoning, and the doctor has to do the same, with the advantage, however, that some knowledge of the subject and ability to corral what we call facts gives him.

A common cause for prostatitis is masturbation. It almost seems to me that this solitary vice is the most common of all the causes. We find that almost all captive animals, if not caged up with mates, masturbate. The human male animal after puberty, if virtuous and single, behaves sexually a good deal like the caged and unmated monkey—he masturbates. The more intellectual, the saner will be his modes of eating, sleeping, working, thinking, and the more choice he will be in his associations. The more temperate he is in drinking alcoholic beverages, the less he will masturbate, but I am afraid he will masturbate some way, sometimes, unless properly mated. Now, the amount of prostatitis set up will be in direct ratio to the amount of self-abuse that he allows himself, and I do believe that if he did masturbate but once in a year, the damage done would not be enough to set up structural and functional changes, but unless he mates he will masturbate, and probably more than once a year. Mastur-

* Read before the American Electro Medical Society at Chicago, Dec. 2, 1903.

bation never satisfies the sexual appetite. Our alcoholic friends tell us that the more one drinks the thirstier one grows. It is the same with masturbation. Sexual longings become almost uncontrollable with a man suffering from a masturbation prostatitis.

A prominent lawyer consulted me once for relief of symptoms due, as the examination revealed, to a prostatitis. For about a year he had visited an estimable and religious young lady to whom he was much attached and who appeared to reciprocate his affections. Almost daily he called on his lady love, and in a short time they became so familiar that no privileges was denied except that of sexual intercourse. The lover still kept coming, fascinated and hopeful of gaining his point. But the fortress resisted successfully every art of ingenuity and passion. Finally my patient had to desist, with the prostate in a fearful state of subacute inflammation. He is now married, but his prostate has remained a *locus minoris resistentiae*.

Many young men derive comfort from the erroneous belief that masturbation means the use of the hands, but that titillation brought on otherwise, as with his sweetheart on his lap, etc., is not harmful, till otherwise taught by symptoms referable to the prostate.

Since our study is more directly engaged with chronic prostatitis and its exacerbations, we can afford to but cursorily allude to causes such as trauma, the presence of a calculus or other foreign body in the posterior urethra. Excessive use of drugs, such as cantharides, phosphorus, etc., irritating injections, errors of diet, horseback and bicycle riding, may lead to prostatitis; as a rule, however, only to exacerbations of the chronic type. Coitus interruptus is another common cause. It is a question how often economy

on the part of the husband, or fear of offspring and its labors, trials and privations on the part of the wife, is a motive that leads to this pernicious habit that fancies it can cheat nature.

The important role, however, as an etiological factor, is played by gonorrhea. Zuckerkandl says: "Inflammations of the prostate are, with the exception of the gonorrheal ones, not frequent; as primary idiopathic processes they are the greatest of rarities. There is evidence lacking that trauma or cold act as causes."

Thompson, Guyon and Socin doubt that a healthy prostate may be injured by riding on horse or bicycle, but of course a sick prostate may sustain exacerbations by such means.

We must stop to consider for a moment the relation of infection to congestion and inflammation. It does appear that a masturbating and withdrawal prostatitis can exist for quite a time without infection, but of course must be looked upon as factors favoring secondary infection. Trauma in particular is harmful not so much because of the harm that it does in itself, as because it favors and frequently necessitates secondary infection; hence the frequency with which prostatitis follows after non-surgical (that is, dirty) catheterization or sounding.

Excess in venere is also looked upon as a cause. If so, it proves a rare one; other factors more easily explaining the etiology. Disease in the neighboring organs, while acting as predisposing, contributing or exacerbating factors can hardly be arraigned as causes, such as, for instance, hemorrhoids, fistula, fissure, constipation, varicocele, congenital phimosis, narrow meatus, urethral stricture, etc.

Prostatitis in the wake of typhoid fever, etc., has been observed.

The causes, then, of prostatitis would seem to be direct and metastatic infection,

most commonly gonorrheal, masturbation and coitus reservatus.

Finger, Furbringer and others have microscopically studied the pathological anatomy, and found it to show just what our knowledge of chronic inflammation applied to the prostate gland would lead us to expect. The changes are in the beginning catarrhal, that is superficial, being mainly a desquamative process. On the continuation of the cause this condition is carried to the lumen of the glands, and from there soon follows a periglandular infiltration, leading to changes of the tubules and their epithelium. Dilatations, occlusions, and various forms of degeneration; the parenchymatous tissue undergoing finally cicatricial tissue metamorphosis, with or without multiple abscess formation and calcification.

A consideration of this pathology with its extension to the internal vesicular sphincter will readily explain the somewhat varied symptomatology, the difference from normal in the size, form and tenderness of the gland. We can thus understand why one set of standard authors proclaim there is no prostatitis without prostaticorrhea, while the other equally authoritative set assert that prostaticorrhea may be a symptom, but is as often absent as present. In fact, a prostatitis may exist for a long time, unbeknown to the bearer. It would seem that the activity, extent and character of the inflammatory process as it affects the glands and involuntary and voluntary muscle fibers of the prostate would serve to furnish a satisfactory explanation. The diagnosis must exclude syphilis, tuberculosis, tumor, and hypertrophy. If the catheter reveals residual urine, the case is one of hypertrophy, from a clinical point of view, and must be treated as such. Bimanual palpation determines the presence of prostatitis. The rectal finger will dis-

close changes from the normal as to form, movability, softness or hardness, amount of prostatic expression, and tenderness. Posner proposes to pass two ounces of urine in a glass and a like quantity in a second glass, the rest of the urine still being retained in the bladder. Then massage and express the prostate, and let the patient pass the last portion of the urine. If chronic prostatitis is present, this portion of the urine will be found cloudy. The microscope will show pus corpuscles, shreds, epithelium in excess, and probably micro-organisms. Gonococci have been found in many cases.

The diagnosis further considers the co-existence of disease of the associated sexual and urinary organs, as the seminal vesicles and bladder, ureter and kidney, and disease of neighboring organs, as the rectum. I have found the examining cystoscope an extremely valuable adjunct in showing the presence or absence of cystitis, vesical ulcers, ureteral pathology and calculus. It seems to me at the present state of our knowledge an injustice to the patient not to have recourse to this valuable and simple diagnostic resource.

The diagnosis further interests itself with a thoro general examination of the body and mind of the patient, and his habits.

Guyon says prostatitis is difficult but not impossible of cure. I agree with this dictum. Both patient and doctor must understand that it will take months, sometimes years, to furnish a clinical cure.

TREATMENT.

Success will largely depend on the length of time the disease has been in existence, its cause or causes, and structural changes; but no less on the choice of method employed, and the ingenuity and versatility displayed by the doctor in meeting the ever-changing indications. As a preliminary, tho by no means always

necessary, measure it may be well to remove, if present, phimosis, varicocele, stricture, hemorrhoids, congenitally narrow meatus, prostatic calculus, and other surgical conditions.

Purely symptomatic treatment is harmful and irrational. The choice of methods will to a great degree depend on whether the local changes are catarrhal, i. e., superficial, or whether there are periglandular infiltrations with destruction of the affected gland tubes, or many cystic dilatations. Prepare your patient for the fact that constant relapses will occur, an undesirable but natural and regular occurrence. There is to be a long fight for health, with reasonable grounds for hope of success, provided perseverance, good judgment, skill and experience manage the case.

Every factor tending to cause congestion of the prostate is to be avoided, as the ingestion of alcoholics or irritating (excess of meat and condiments) or too rich or too much food. The patient's life must be regulated along the well-known and daily neglected laws of hygiene. Even these laws have to be individualized, and it may be that the sound judgment and management of the attendant will be able to accomplish success by means of more than one method. Now rest, now exercise, now home or hospital treatment, then again ambulatory office treatment will seem preferable. Travel, mountain and seaside resorts and sanatoria effect cures when all else fails. The problem of treatment here as elsewhere depends upon the socio-economic condition of the patient, his intelligence and culture, his character and temperament, his age and constitutional diathesis. It is the richness of the field that accounts for the prolific crop of forms of treatment. The problem with us always is to choose what suits best the case in hand. We must be as quick at

changing our front as our patient's condition changes his. With a due appreciation of all the facts, we review cursorily our more common resources at hand, so far as local treatment is concerned, whenever that becomes necessary. We recollect right here that all forms of local treatment are unnecessary in some cases, and in some cases are useful only at varying intervals, while in many some form of local treatment will be absolutely indispensable if we wish to conserve the best interests of our patient. Space absolutely forbids more than a partial enumeration of these local means used; a critical comparison of these methods would be impossible, since opinion is divided, and the subject does not lend itself to the ordinary methods employed for scientific demonstration. It is probable that time will be the arbiter. Cupped sounds for the application of salves may have proven beneficial, no doubt, in the past, but are now almost obsolete. On the whole, it appears that salves or ointments are now but rarely used. They are more difficult to sterilize, more difficult to localize, of too superficial action in concentration similar to solutions, and the tubes and syringes used for their employment are difficult and time-taking to clean, besides they do not seem to possess a single feature that solutions do not possess in an equal or a far superior degree.

Prostatic dilators, with or without irrigation attachments, are, it seems to me, of more than doubtful utility. They are painful to use, cause more reaction than necessary or useful, and expression of the prostate is infinitely more efficiently done by massage. The urethral sound of the larger caliber that the urethra will admit, used at intervals, appears almost always to be grateful to the patient in relieving one or more of the common prostatic symptoms. The prostatic endoscope and the

local application thru its aperture of silver nitrate and mercury bichlorid solutions has proven but moderately useful in the writer's hands. Socin's assistant claims very beneficial results, especially from bichlorid of mercury applied this way once in five to seven days. I have abandoned in most cases the use of the prostatoscope, and favor a Guyon catheter instilling syringe. I have also abandoned the Ultzmaun silver catheter syringe, the pattern after which Guyon made his syringe, because the pressure and stiffness of the hard and unyielding silver tube were found to be more annoying to the patient than the soft, yielding gum catheter of Guyon; besides you always know just where you are with the latter.

The Guyon bulb catheter is withdrawn as far as the posterior aspect of the compressor urethra muscle; the last few drops of the urine allowed to escape, and the instillation is then made. Nitrate of silver in rather weak solution, 1/1000 to 1/500; mercury bichloride solution, 1/5000, have proven useful. My patients have apparently almost always liked argyrol solution, 15 per cent, best of all. Argyrol is decidedly less irritating than protargol. Argyrol and bichlorid, single or combined, are my favorites, but I do employ occasionally picrotol, 1/20 per cent; copper citrate, saturated solution; ichthyol, 1 to 10 per cent. Collargol, 1/5 to 2 per cent, has also been found useful. Sulphate of copper I have always found to be too irritating, even in weak solutions, and have discarded its use entirely. All vegetable agents like ergot, hamamelis, tannic acid, hydrastis, kino, krameria, depend on their superficial astringent effect principally, and are not antiseptic or alterative. I have therefore given them no trial.

Iodoform I have not used because both my patients as well as myself objected to the odor; besides I have never known

an instance in my general surgical practice where it was not easy to displace the iodoform that has led the big and the little doctor around long enough by the nose. I consider it irrational to use insoluble substances, like bismuth, subnitrate and lead. It has been my practice to always instill a Guyon syringe-full; in that way the prostatic urethra is somewhat distended, and the medication made as extensive as desirable, with a little useful overflow over the internal vesical sphincter. And, again, the ever-present drop of urine is less liable to readily decompose ninety drops of solution than one to ten drops.

When employing the bulbous Guyon catheter, use the smallest bulb that will be arrested by the posterior face of the compressor urethra muscle on withdrawal. When introducing the bulbous catheter it frequently becomes arrested by the anterior face of the compressor urethra. One of my patients, when directed to divert his thoughts, to relax this muscle, told me he could do that now easily and efficiently by thinking how to find money to pay numerous bills with.

Prostatitis, when long-standing, sets up a motor neurosis of the internal and external vesical sphincter, a so-called cystospasm, which eventually leads to contracture of the neck of the bladder, and residual urine. I have observed that Guyon's instillations have cured cases of the latter kind.

Competing in usefulness with Guyon's instillations, if not superior, is massage of the prostate per finger in rectum. A treatise might be written giving directions. The principle is, express the prostate patiently one to six times a week. The process, however, must not be severe enough at any time to aggravate the symptoms. While massaging, the pressure must be steady and not intermittent; the

movements slow, covering all of the surface of the organ. Periprostatic adhesions frequently give way to massage extended over a long period of time.

Very useful also is galvanism. Placing the positive pole inside the lumen of the prostatic urethra, use three to five milliamperes once or twice a week, five minutes for a seance, observing carefully the results. Galvanism has seemed of especial benefit in atonic conditions. I frequently associate or alternate the sound, Guyon's instillations, prostatic massage and galvanism, almost to the exclusion of other local measures, with the exception of an antipyrin 10-grain suppository, which patients afflicted with exacerbations of pain use at such times, with some relief.

The mechanical vibrator, while of benefit sometimes, on the surface of the body, I have found of little or no benefit when employed intrarectally; in fact, in some instances it has aggravated the symptoms.

With the x-ray I have no experience whatsoever, but believe from what I read in the literature that it may prove of value in some cases.

Von Hogge has also used an apparatus in the form of a finger-like instrument, on whose volar side is a platinum plate, isolated as a negative pole; introduced into the rectum. The positive pole is on the surface of the body. It is simply mechanical massage plus galvanism.

It is unfortunately true that no mechanical instrument in the nature of things will ever be able to take the place of the sentient and intelligent finger. I employ solutions and suppositories, otherwise, as mentioned, very rarely, for I have seen no benefit follow their use. I object to the home use of the psychrophore, as liable to lead to infection. It is of no benefit otherwise. Very frequently, however, I recommend for home

use the Artzberger cooling or heating rectal apparatus. It is important, however, to keep the bowels, especially the rectum, empty, by means of rectal and colonic douching, if necessary. Suitable aperients may be used, and above all, the establishment of proper ways of eating, drinking, sleeping, work, exercise, rest, ventilation and bathing. It is wonderful what these regulations will do for our patients.

I have performed bilateral vasectomy, with some amelioration, in a case of a widower over fifty years old. I have never proposed or performed a Bottini galvanocautery incision, for I do not see how in a case of prostatitis not complicated by residual urine a single or even multiple endoprosthetic cauterization can do much, if any, good, and it may and frequently does do harm.

Perineal prostatotomy does not appeal to my judgment. I have not even seen claims of a cure or improvement from that procedure.

Castration might do some good, but its relatively high mortality rate has made it an obsolete operation for this purpose.

As to sexual intercourse among the married, I will say that I advise absolute continence when patients feel in any way worse after the act; otherwise I recommend an economical use of this function at rare intervals. The sensations and experiences of the patient in the main are the guide. During periods of exacerbation I have observed decided benefit from the painting of the perineum with strong tincture of iodine. This procedure compels the patient *volens nolens* to avoid bringing to bear any pressure on the prostate. It is well to recall that under physiological conditions the greatest enemies of the *libido sexualis* are hard mental and hard physical labor.

Faradic treatment, a molecular mas-

sage, except in old and atonic cases, I have found to be harmful if locally applied. It is too rough a form of treatment. If the disease progresses in spite of all treatment, or no treatment, and the patient is seen to gradually lose ground more and more, getting ready for consumption, as it were, then, and long before that time, it will be proper to propose perineal prostatectomy, which, if done according to the classical description given by Murphy in one of the late editions of the Journal of the American Medical Association, will furnish relief and rid the patient of an organ diseased beyond cure. Of course, the *vis coeundi* and *vix generadi* are lost with this operation, but those patients have lost both powers before,

so on that score no real additional injury is inflicted.

As to the internal drug treatment, I have to say but little, since that must be largely symptomatic, sedative, stimulating, reconstructive. Maltine, the hypophosphites with and without strychnia, animal and vegetable digestants, vegetable aperients, saline cathartics, brom-soda, soda, camphor monobromid, hyoscyamus, saw-palmetto, urotropin, sodium bicarbonate, acetanilid, according to indications, I have used, with relief to my patients.

I regret to have not previously referred to the static machine, which in many cases, especially of the neurasthenic type, is a *palliativum* of the very first order.

International Electrical Congress of St. Louis.

12-17 September, 1904.

Under the auspices of the Louisiana Purchase Exposition an International Electrical Congress will be held in St. Louis during the week 12th to 17th September.

The congress will be divided into two parts, namely:

(1) A Chamber of Government Delegates appointed by the various governments of the world, invitations to which were issued at the beginning of the year from the United States Government. The transactions of the Chamber of Delegates will relate to matters affecting international questions of electrical units, standards, and the like.

(2) The congress at large, divided into eight sections, as follows;

General Theory—Section A, Mathematical, Experimental.

Applications—Section B, General Applications; Section C, Electrochemistry;

Section D, Electric Power Transmission; Section E, Electric Light and Distribution; Section F, Electric Transportation; Section G, Electric Communication; Section H, Electrotherapeutics.

Our readers will be interested in Section H—the Electrotherapeutic Section.

The president of the Committee of Organization is Professor Elihu Thomson, of Lynn, Mass. The vice-presidents are B. J. Arnold, Professor W. E. Goldsborough, Professor H. S. Carhart, C. F. Scott, Dr. S. W. Stratton.

The chairman of Section H is Dr. W. J. Morton, New York City, and the secretary is Mr. W. J. Jenks, of New York City.

Three hundred and forty-three official invitations were issued some months ago to well-known workers in electricity, inviting papers for the congress; 168 of these invitations were issued to persons

residing in countries outside of North America. As a result of these invitations 105 American and 59 foreign specially-prepared papers are promised to the congress. Of these five foreign and fifteen American papers are in Section H, as follows:

Section H—Electrotherapeutics. Chairman, Dr. W. J. Morton; secretary, Mr. W. J. Jenks.

Prof. M. Benedict—"Radiology in the Pathology of the Brain."

Dr. J. Bergonie.

M. le Docteur G. O'Farrill—"Some Improvements in Generator Apparatus of High-Frequency Currents."

Prof. S. Schatzky—"The Ionic Theory as Biological Basis for the Therapeutic Action of Electricity"; "Experimental Researches on the Treatment of Tuberculosis by Constant Current."

Dr. J. Riviere—"Physico Therapy of Neurasthenia."

Dr. Carl Beck—"Recent Advances in Roentgen-Ray Science."

Dr. Russell H. Boggs—"Diagnosis of Calculi by X-Rays."

Dr. G. G. Burdick—"Radiations in Therapeutics."

Dr. Margaret A. Cleaves—"The Nature of the Changes Established in Living Tissue by the Action of Oxidizable Metals at the Anode."

Dr. Charles R. Dickson—"Some Observations Upon the Treatment of Lupus Vulgaris by Phototherapy, Radiotherapy, and Otherwise."

Dr. Emil H. Grubbe—"X-Rays and Radio-Active Substances as Therapeutic Agents."

Dr. T. Proctor Hall—"The Principles of Electro-Therapeutics."

Dr. J. H. Kellogg—"Electro-Therapeutics."

Prof. Jaques Loeb—"The Control of Life Phenomena by Electrolytes."

Dr. John Williams Langley—"The Purification of Water for Drinking by Electricity."

Dr. G. Betton Massey—"The Cathodic Diffusion of Metallic Ions in the Destructive Sterilization of Cancer and Tuberculous Deposits."

Dr. W. J. Morton—"Artificial Fluorescence of the Human Organism as a Means of Treating Disease."

Dr. C. S. Neiswanger—"Static Electricity in Chronic Nephritis."

Dr. Clarence E. Skinner—"A Large Fibro-Sarcoma Treated by X-Radiance."

Dr. Wm. Benham Snow—"Static Electricity in Therapeutics."

Up to the 30th of June, 1907, adhesions to the congress had been received, of which about 1,300 have paid their subscriptions of \$5 each. Of these, 291 are from countries outside of North America. The following societies will co-operate with the congress at St. Louis, by holding simultaneous conventions and joint sessions:

The American Institute of Electrical Engineers.

The American Electrochemical Society.

The American Physical Society.

The American Electrotherapeutic Association.

The Association of Municipal Electricians.

The following societies will co-operate with the congress by appointing delegates:

The National Electric Light Association.

The Association of Edison Illuminating Companies.

The Societe Internationale des Electriciens.

The Schweizerischer Electrotechnischer Verein.

It is expected that various other European societies will also co-operate.

Fourteen thousand six hundred invitations have been issued to persons interested in electricity all over the world, inviting them to join the congress. It is expected that the transactions of the congress will attain two or three large volumes. Persons interested in electricity

and who desire to join the congress should apply to the general secretary, Dr. A. E. Kennelly, Harvard University, Cambridge, Mass.

Each member of the congress is entitled to receive one set of the transactions. It is intended to issue the transactions of the congress, when printed, to libraries and non-members for \$10 per set.

American Electro-Therapeutic Association.

The fourteenth annual meeting of the American Electro-Therapeutic Association will be held at the Inside Inn, St. Louis, Mo., September 13, 14, 15 and 16, 1904. The scientific sessions will be held only in the mornings, leaving the afternoons free in which to visit the attractions of the fair. It is believed that a large proportion of the members of the association will be present this year, as the World's Fair offers many attractions in itself; and in addition to the convention of our association, there will also be held in St. Louis, from the 8th to the 17th of September, the annual convention of the American Roentgen Ray Society and the convention of the International Electrical Congress. These events will make St. Louis a point of great interest to us at the time of our convention there.

As the convention is to be held at the Inside Inn, it is very desirable that all the members should have their quarters in this hostelry; hence if you have not already engaged your rooms, it would be wise for you to write and do so at once on the reservation blank contained in the descriptive pamphlet of the Inn which I sent you two months ago.

The following amendments to the Constitution and By-Laws, notice of which was given at the 1903 meeting, will be voted upon at this meeting, namely, Sec-

tions 9, 10 and 11 of the Constitution to be so amended that they will read as follows:

"Every applicant for membership, whether a Fellow, Life Fellow, Honorary Fellow, or Associate Fellow, shall be endorsed by two Fellows in good standing, and be presented to the Executive Council through the Secretary, the properly signed application blank to be accompanied by the admission fee of five dollars, which shall also constitute, in the event of election, the annual dues of such applicant for the year during which he is elected. If he is not elected the five dollars shall be returned to him with notice of rejection. The Executive Council shall make due inquiry concerning the professional attainments and standing of the applicant, and if satisfied as to his eligibility, shall instruct the Secretary to notify each Fellow that the election to fellowship of such applicant is recommended, and that unless good and sufficient reasons for rejection are communicated to the Secretary within a stated time (which shall be not less than two weeks), such applicant shall be considered duly and properly elected. A postal card directed to each Fellow at his address last known to the Secretary shall be considered sufficient notification of such impending election.

If no such communication is received

within the specified time, the applicant shall be considered as duly elected as Fellow of this Association, and a duly executed certificate of membership forwarded to him forthwith; if such a communication is received, election of the applicant shall be deferred until the annual meeting following, notice that such applicant will be voted upon being sent to each Fellow at least one month before the date of such meeting. A two-thirds vote in the affirmative of all the Fellows present shall be necessary to elect at such meeting; fifteen Fellows at least being in attendance.

10. The signature of an applicant upon his membership application shall, in case he is elected, be considered as equivalent to his signature to the Constitution and By-Laws, and shall be binding upon him as concerns his submission to the regulations contained in said Constitution and By-Laws.

11. The function of nominating Honorary Fellows shall be vested in the Executive Council.

Section 57 of the By-Laws to be omitted entirely, and by-law 58 to be so amended as to read, "Each Fellow shall pay annually in advance to the Secretary the sum of five dollars, which shall constitute his annual dues."

The preliminary program to date, subject to amplification and revision, appears below:

"Some Observations on the Medical Uses of the Constant Current."—Daniel Roberts Brower, of Chicago, Ill.

"The Therapeutic Application of the Continuous Current."—Truman Abel Pease, of Norwood, N. Y.

"Exhibition of a New Current Controller and Discussion of the Methods of Therapeutic Control of Street Main Cur-

rents."—George Betton Massey, of Philadelphia, Pa.

"The Cataphoric Treatment of Cancer."—Amedee Granger, of New Orleans, La.

"Clinical Reports of Some Interesting Cases Treated by Electricity."—Samuel Fairweather Wilson, of Montreal, Canada.

"Clinical and Experimental Effects of Electrical Currents of High Potential and Frequency."—John Holcomb Burch, of Baldwinsville, N. Y.

"Therapeutic Action of High Frequency Currents."—Walter Henry White, of Boston, Mass.

"Electro-Therapy of the Psychic and Sympathetic Neurone Centers."—Charles H. Hughes, of St. Louis, Mo.

"The Physiotherapy of Neurasthenia."—T. Riviere, of Paris, France.

"The Value of the Roentgen Ray in the Diagnosis of Fractures."—Mihran Krikor Kassabian, of Philadelphia, Pa.

"Diagnosis of Calculi."—Russell Herbert Boggs, of Pittsburg, Pa.

"Further Researches in the Treatment of Tuberculosis."—Jefferson Demetrius Gibson, of Denver, Colo.

"A Case of Hyper-Idrosis of the Axillæ Cured by the X-Ray."—George H. Stover, of Denver, Colo.

"Violet Light Baths; their Physiological and Therapeutic Effects."—Ernest Albert Weil, of Paris, France.

"The Use of the Ultra Violet Light in Therapeutics."—Albert Eugene Stern, of Indianapolis, Ind.

"Locomotor Ataxia Successfully Treated with Ultra Violet Rays."—Joseph Monroe Liebermann, of New York, N. Y.

"Some Aspects of Phototherapy."—Charles Rea Dickson, of Toronto, Canada.

"Photo-Therapy in Chronic Diseases."—John Harvey Kellogg, of Battle Creek, Mich.

"The Importance of Associating Other Physical Measures with Electricity in Therapeutics."—William Benham Snow, of New York, N. Y.

The members of the Committee on Arrangements are C. H. Hughes, M. D., chairman; A. V. L. Brokaw, M. D.; John Young Brown, M. D.; C. G. Chaddock, M. D.; Pinckney French, M. D.; Marc Ray Hughes, M. D.; B. M. Hypes, M. D.; L. H. Laidley, M. D., and W. G. Moore, M. D., all of St.

Louis. These gentlemen have arranged social features and amusements for the ladies who will accompany members, which will appear in the completed programs which will be distributed at St. Louis. Any further information can be obtained by writing to the secretary or the chairman of the Committee on Arrangements.

CLARENCE EDWARD SKINNER,

Secretary,

New Haven, Conn.

Fifteenth International Congress of Medicine, Lisbon, April 1906.

"We have received the first number of the Journal of the Fifteenth International Congress of Medicine, that will take place in Lisbon on the 19th to 26th of April, 1906. This number contains the statute of the Congress, the organization of the sections and of the national committees of the different nations. One must remark in the statute the second article, that only admits in the Congress, beyond the doctors, the scientific men presented by the National or Portuguese committees.

The contribution is of 25 francs or 20 marks or one pound sterling.

The work of the Congress is distributed in seventeen sections:

1. Anatomy (descriptive and compared anatomy, anthropology, embryology; histology).
2. Physiology.
3. General pathology, bacteriology and pathological anatomy.
4. Therapy and pharmacology.
5. Medicine.
6. Pediatrics.
7. Neurology, psychiatry and criminal anthropology.
8. Dermatology and syphilography.

9. Surgery.

10. Medicine and surgery of the urinary organs.

11. Ophthalmology.

12. Laryngology, rhinology and stomatology.

13. Obstetrics and gynecology.

14. Hygiene and epidemiology.

15. Military medicine.

16. Legal medicine.

17. Colonial and naval medicine.

The executive committee of the Congress has the intention to print, before the reunion, all the official reports; it is necessary that they shall be given before the 30th of September, 1905, to the General Secretary. For the free communications it is necessary that they should be given before the 31st of December, 1905, if the authors want that the conclusions should be printed before the opening of the Congress.

The official language is the French. In the general assemblies, as in the sections, the English, German and French may be used. We see that the committee of the Congress has excluded the Portuguese from the languages permitted; this has only

been done with the intention of diminishing the number of languages spoken; there can be no jealousy when the legislator begins by sacrificing himself.

The president of the committee of organization is the doctor M. da Costa Alemão; the general secretary is the doctor Miguel Bombarda; all the adhesions must be addressed to this doctor (Hospital de Rilhafolles, Lisbon.)"

Electrical Action in Plants and Animals.

Some of the results of the latest investigations of electrical phenomena in plants and animals are given in an article by Dr. W. Biedermann in the *Ergebnisse der Physiologie* (Wiesbaden).

Nowhere else in organic nature is there an example of the direct generation of mechanical and electrical energy on a large scale, of corresponding adaptation of structure and change of function, similar to that found in the so-called electric fishes, which have the power of discharging electricity at will as a means of defense.

A number of fishes have this power to a certain degree, but the electric organ is most perfectly developed in the South American eel (*Gymnotus*), in which there is a pair of electric organs lying on the ventral side of the tail; in the electric sheath-fish (*Malapterurus*), in which the electric battery ensheaths the body; and in the fish known as the "torpedo," which has electric organs on each side of the head.

STRUCTURE OF THE "ELECTRIC" ORGANS.

The organs consist of columns of living tissue that originate as muscle but lose all resemblance to it in the course of development and take the form of thin plates, a fraction of a millimeter thick, placed one above another. The organ has a very large nerve that sends a branch to

each plate, and this branch subdivides, inside the electric plate, into fine threads, forming a delicate network connected with innumerable microscopic electric rods. The active electro-motor principle is supposed to lie in this delicate terminal network, with its electric rods, and the degree of electric power is directly correlated with the degree of development of this structure. It is a noteworthy fact that the blood supply of the electric organ is very meager as compared with the blood supply of the muscles. In the ray fishes the blood vessels never penetrate the plates that compose the organ, but lie between them.

Observations of the action of the electric current were made by means of a telephone placed in connection with the fish and provided with a device attached to the vibrating disc, by means of which any electrical stimulus conveyed to it would be registered by a line drawn on paper. It was found that often there is an electric discharge from the fish while swimming, without any defensive purpose. On account of the manner of swimming, the positive pole of the apparatus was sometimes stimulated, and sometimes the negative pole, and it was found that the quality of the sounds produced through the telephone varied according to the pole stimulated, and may be either weak and dull or sharp and crackling. The electric organs on both sides of the body always discharge simultaneously, like one organ. There is no voluntary variation in the strength of the discharge, but the shock may be made more intense by the cumulative effect of more rapid discharge of the electric organ. A single stimulation of the organ in the electric sheath-fish will produce a whole series of discharges a fraction of a second apart.

The writer distinguishes *weak* and *strong* electric fishes. In the former the organ lies deeper in the tissues of the body and lacks the finer development of nervous structure found in the latter.

"ELECTRICAL" PLANTS.

There are certain noteworthy observations on manifestations of electricity in plants which promise to be of great interest from the theoretical point of view. There are probably always electro-motor activities in the different parts of plants, which, it is reasonable to assume, are due to chemical differences in the different layers of cells, and they have been observed, not only as responses to mechanical stimulation, but as accompanying manifestations in the assimilation of carbon dioxide in the regular process of plant nutrition.

Certain plants, among them iris, nicotine, begonia and nasturtium, are more favorable than others for these experiments. If one of them be placed in connection with a galvanometer by means of electrodes attached to leaves on different sides, and one side of the plant be exposed to sunlight while the other side is kept shaded, then within from three to ten seconds after exposure to sunlight there will be a flow of electricity from the lighted to the shaded parts and a potential difference of .005 to .02 volt. This continues for about five minutes, when the magnet begins to swing back and shows an opposite current of consid-

erable magnitude. The manifestations are similar to those of tetanized nerve.

The electric current of green leaves is least in diffuse daylight, greater in refracted light and most in direct sunlight, and it is further affected by the temperature, 20° C. being the optimum for iris. Cooking the leaves destroys their electric activity, and the electric manifestations are not found in plants that do not have green leaves. This was considered as proof that the generation of electricity accompanies the assimilation of carbon dioxide.

"The creation of a new species of sea life by the use of salt solutions and crossing two varieties has been accomplished by Dr. Jacques Loeb, the physiologist," says a news dispatch to the *New York Herald* (February 26). "The news of this new application of salt solutions has come in an article published by Dr. Loeb in *Pfluger's Archiv.* * * * The crossing of the sea-urchin and the starfish is Dr. Loeb's recent achievement. Starfish and sea-urchins live in the ocean under the same conditions, but scientists have found that in the natural sea water the two do not cross, as do many species of animals. Dr. Loeb used an alkaline solution containing the salts of sea water and sodium hydrate. The result was a new child of the sea, neither sea-urchin nor starfish, but combining the qualities of both. Dr. Loeb has repeated the experiment more than once.—*Literary Digest.*

Effects of Different Lights Upon the Eye.*

BY D. W. WEAVER, M. D., GREENSBURG, IND.

Vision is the production of sensation upon the retina from which it is conveyed to the brain centers, where the impressions are formed. We speak of, or associate light with, these sensations upon the retina; but it is not essential in their production. A blow upon the eye in utter darkness will produce a sensation upon the retina that gives the impression in the visual centers of a flash of light. But in this paper we want to consider only the sensations produced upon the eye by light.

Nature provides us with plenty of good, wholesome daylight from the dawn of day until night overtakes us again, and besides this man provides himself with more light, lengthens the day by his own illuminants. The illuminant may be electricity, acetylene, natural or artificial gas, petroleum oil, tallow candle or pine-knot, as he may choose.

The light rays, from whatever source, penetrate the eye—the cornea, lens, aqueous and vitreous humors and the eight transparent layers of the retina without producing any sensation of vision. But as they fall upon the rods and cones with their pigmented epithelial covering, the visual sensations are produced.

The pigment in this layer of the retina is spoken of as "visual purple." Upon it the images are formed through a bio-chemic process. This "visual purple," as the sensitive photographic plate, decomposes or exhausts its image-producing properties upon exposure to light, but different from the photographic plate in that, under normal conditions, it is reproduced as fast as exhaustion takes place.

The retina must be dark for its reproduction.

Some writers claim that there are different pigments, and that they are affected by different lights, i. e., the pigment that is affected the most by yellow or orange rays, is but little affected by the violet or ultra-violet rays, and the one affected by the violet is but little affected by the orange, and so on. It is the arresting of the biological reproducing process of these pigments that causes color-blindness and amblyopia. Other factors than the over-use of the eyes are often responsible for this—such as an excessive indulgence in alcohol and tobacco, and syphilis.

I believe that there are very few cases of acquired color-blindness that have not as their predisposing cause alcohol, tobacco or syphilis, and as exciting cause prolonged eye strain under artificial light. Though I have no statistics to back me, I believe that an over-use of the eyes under an incandescent electric or gas illumination will produce color-blindness more than under any other light. This is on account of the large proportion of violet and ultra-violet in these lights.

The violet and ultra-violet rays possess an actinic or chemical property. It is these actinic rays that are irritating to the visual layer of the retina. For this reason the light with a small proportion of these rays is the light that least of all tires the eyes.

The different worth of the various lights can be best illustrated by a prismatic analysis. We find by this analysis that the sunlight consists of 97.3 per cent orange, yellow and green rays to the 2.7 per cent violet; daylight, 13 per cent vio-

*Read before the Indiana Institute of Homeopathy, 1903, and published in the *North American Journal of Homeopathy*, May, 1904.

let; incandescent electric light, 28.9 per cent; gaslight, 28.9 per cent; petroleum light, 24.6 per cent; voltaic arc light, 3.9 per cent. This shows that the sunlight contains the least of these irritating violet rays in proportion to the orange, yellow and green (which are the most comfortable to the eyes). Second in the list comes the arc light, which comes nearer possessing the same quality as sunlight of all our artificial lights. Also that the petroleum lamplight contains less of these irritating rays than the incandescent gaslight.

This table is by Meyer, and as he does not give the spectrum of the candle or acetylene (pine-knot), I am unable to give the percentage of violet they contain.

Meyer also claims that the violet rays control the action of the pupil, and that the pupil will only admit (under normal conditions) a certain amount of violet rays. He says that this accounts for the lack of clearness of objects on what is called a "gray day," because on such days the per cent of violet is greater, and for this reason the pupil smaller, in proportion to what it is on a clear, bright, sunny day.

Under the quality of light I might also call your attention to the fact that some lights possess more heat than others, and heat rays are injurious to the eyes. An excess of violet, ultra-violet or heat rays (red) can produce any of the simple inflammatory diseases of the eye or its appendages, and in those diseases that have deeper underlying causes, light poor in quality is a potent factor for their aggravation.

Regarding the quantity of light, but little need be said. We need sufficient light whatever we do; that's a fact no one cares to dispute. Without enough of

light it is an utter impossibility to get a clear image formed upon the retina. It is understood that we need less illumination for ordinary seeing than we do for close work, as reading, because we do not care whether or not the reflection upon the retina is clear. Even in this case the illuminating of rooms for general purposes should be clear thruout to be easy and restful to the eyes. There is practically very little danger of over-illuminating (under the present stage of artificial illuminating), providing the light is diffused and evenly distributed. The danger is of under-illuminating for close work, or, if this is remedied, of producing a glaring, poorly distributed illumination.

Steadiness of light must be considered. Light, to be non-injurious to the eyes, must be steady. A flickering light, as well as the dazzling light of the "moving pictures" is tiresome to the ciliary muscles and at the same time will produce a congested retina.

As to the position, light should fall upon the book, while reading, at right angle or nearly so; that means that it should be falling over the left shoulder. The effect of a light placed in front, even if shaded, produces a glare and heat, and as such is injurious.

DISTRIBUTION OF LIGHT.

An even distribution of light is necessary for the comfort of the eyes. I might give as an example of such a light the diffused sunlight. In the illuminating of rooms the light is more restful to the eyes if the room is illuminated evenly thruout. And for reading it is more essential that the light is evenly distributed over the page to be read than it is for an even distribution in a drawing room. Let, for instance, light be clear upon one-half of a page and upon the other half be

shaded and see what the result will be. The eye, following line after line across the page, from light to shadow, and again to light, and so on, for but a very short time will tire. The ciliary muscles will be overworked in trying to regulate the light thrown upon the retina.

There are other factors that might be considered in a paper of this kind, but time will not permit.

Finally, the best illumination for the eyes is the diffused sunlight. It is the richest light in yellow, orange and green

rays, is evenly distributed, is steady, is not glaring and can be had of sufficient quantity.

Man has devised innumerable kinds of shades with which to overcome the objections to the artificial lights. He has succeeded admirably well, yet there is a vast fortune awaiting the inventor of a light of the composition of diffused sunlight.

I acknowledge the free use of the paper, "Artificial Lights," by Dr. F. Park Lewis, of Buffalo, N. Y.

Psycho-Therapy.

BY HENRY W. ROBY, M. D., TOPEKA, KAS.

I wonder how many of your readers know that there is a new wave of enthusiasm going over the country and the world as well in the matter of therapeutics, and that psycho-therapeutics is to be the cult of the near future? Many attempts have been made to graft onto medical practice what long ago was variously called exorcism, magnetism, mesmerism, clairvoyance, electro-biology, odyllic force, impoulevablia, braidism, hypnotism, and lastly, psycho-therapy. The thing known as odyllic force was imperfectly known thousands of years ago, and less used with perplexing effect by the priests of Thor and Woden, of Osiris and Minerva and many others in very ancient times. And Christ in His time made a most astonishing use of it in healing the sick in His vicinity and doing many other things erroneously called miracles. For, when rightly and scientifically known, there is no miracle about it, for it is founded on natural law as much as is gravity or cohesion or chemical action. It is a primal gift to mankind in conjunction with intellect and being. At Lourdes, in France,

the priests are at the present time working many cures by it under the false title of Divine Healing or miracle. But in most other parts of the world, except in the domain of Eddyism, those false pretenses are discarded and the procedure is given some decent and respectable name, a name that in some cases comports with the reality. The most frequently used modern terms are hypnotism, suggestive therapeutics and psycho-therapy. In France great hospitals are established and endowed for its practice, and such men as Charcot and Lebault have made great reputations in its use and development.

And in this country many institutions make large or entire use of it in the treatment of disease. And probably a majority of our up-to-date medical colleges have each their chair of psycho-therapy as a part of the regular college curriculum. So that the old yet new therapy is gradually gaining the place in practice that rightly belongs to it. But it still holds too small a place in our labors. I have studied and taught this species of therapy for forty years, and some of my most pleasing and satisfactory triumphs have

been achieved through this benign agency alone. I say benign, for that word best expresses the idea of its absolute safety and total exemption from danger or ill effects. I have done over a hundred surgical operations with hypnotism in place of chloroform for the anesthetic with no possible risk to the patient, as there would have been with a chemical anesthetic. And I have in all such cases been able to conduct the after-treatment to the end without pain or complications. In such cases there is no nausea or digestive disturbance and no chemical shock to the nervous system, and with it I have cured hundreds, and probably thousands, of cases of neuralgias and various nervous disorders. It is only within the last ten years that we have known the real basis and scientific formulary of the subject. In 1893 Thomas J. Hudson gave the world the first book containing anything like the true inductive science in the matter. Before that, all was conjecture and empiricism, men blundered and floundered and disagreed wildly over the basic principles of the latter. But he gave us in that book what Hahnemann did in the organ of drug-therapy, the inductive science of the matter, which enabled the world to go on and work out on right lines the real scientific application and results in the new field of investigation and practice.

Since the appearance of Hudson's book many new works on the subject have appeared, all founded on the same lines of investigation. And today there is no longer any valid excuse for any progressive physician to exhibit or plead ignorance on the subject of psycho-therapy. And he who does not master as much as possible of its truths and principles goes about disarmed of one of the most potent factors in the healing art.

I am moved to these reflections on the

subject by reading one of the most recent works on the subject by my former classmate and co-graduate, Dr. Sheldon Leavitt, of Chicago, published last October under the title of "Psycho-Therapy." That work should be read and re-read by all up-to-date physicians of every school of practice, for, like surgery, psycho-therapy is one and the same thing in all schools of practice. And no one has better stated the field and *modus operandi* of psycho-therapy than Dr. Leavitt. In connection with it much will be gained by reading Hudson's "Law of Psychic Phenomena" and his more recent work, "The Law of Mental Medicine." And I feel like saying this to the profession in a paraphrase of the good old Methodist hymn:

Come, my brethren, let us try

For a little season

Every question to lay by;

Come, and let us reason.

—Medical Arena.

Warts and Moles May Be Dangerous.

The members of the American Academy of Medicine showed much interest in a paper by Dr. W. W. Keen, of Philadelphia, on the dangers of warts and moles. Dr. Keen compared a wart to "a match that can produce a great conflagration," and recommended that all such growths should be removed at once while yet in the harmless stage.

The danger of warts lies in the fact that after years of harmless existence something may cause them to spread. Out of twenty-five persons affected by the malignant spread of warts eleven died in spite of operations, sometimes even amputations.

Dr. Keen's hearers agreed with him that every wart and mole should be destroyed at once and said that he had done well in bringing the matter to public attention.

EDITORIAL

The letter of Dr. Lydston, on page 185, opens up an important question. The combinations so successfully made in the industrial world are a constant incentive to some professional men to go and do likewise. It is not easy to say beforehand whether such combinations will result in good or in evil. If successful, they will be bad for those that are not in the combinations; if a failure, they may be bad for everybody. But whatever our preconceived notions may be, the experiment is certain to be tried, sooner or later. If such combinations prove more economical from a sociological standpoint, they will win, and to fight them will be to fight against social evolution. If they do not prove economical, they will die of their own accord.

Dr. Walter Lindley, the editor of the *Southern California Practitioner*, has recently been elected dean of the medical college of the University of Southern California. This Los Angeles school is now entering its twentieth session. Dr. Lindley was one of the organizers of the school and is professor of gynecology in that institution.

Book Review.

The Practical Application of the Roentgen Rays in Therapeutics and Diagnosis. By William Allen Pusey, A. M., M. D., Professor of Dermatology in the University of Illinois; and Eugene W. Caldwell, B. S., Director of the Edward N. Gibbs X-Ray Memorial Laboratory of the University and Bellevue Hospital Medical College, New York. Handsome octavo volume of 591 pages, with 180 illustrations, nearly all clin-

ical. W. B. Saunders & Co., 1903. Cloth, \$4.50 net; Sheep or Half Morocco, \$5.50 net.

Part 1, by Eugene W. Caldwell, gives an excellent general review of the physical properties of x-rays. The essentials of x-ray equipment are first given. Then follows a discussion of x-ray tubes. In spite of the various forms of regulating apparatus which have been attached to x-ray tubes the regulation of the vacuum, he says, is still in such an unsatisfactory condition that some of the best operators prefer to use simple tubes with no regulating appliance, considering it cheaper and more convenient to keep on hand a large stock of the simple tubes rather than a smaller number of the more costly and elaborate self-regulating tubes. Mr. Caldwell finds also serious defects in the apparatus for interruption of the primary current, none of those used being completely satisfactory. The adaptation of x-ray apparatus to an alternating current without the intervention of a transformer is also a problem still waiting satisfactory solution. The distinction between intensity of x-rays and their quality of penetration is clearly drawn, and the author points out the inadequacy of any of the methods now used for measuring either the penetration or the intensity.

Another defect in x-ray apparatus is the uncertainty of the quality and particularly the want of uniformity of intensifying screens for use with x-ray photographs.

While pointing out the most serious defects in x-ray apparatus, the author is equally careful to describe clearly and fully the best apparatus now in use for fluoroscopy and radiography. Full in-

formation is given for the detailed manipulation during both of these processes.

Almost the only mistake discoverable in this part is found in the picture of a kathode stream from a low tube opposite page 38. The kathode rays in such a tube really cross each other at a short distance from the kathode and diverge from that point as they go toward the anti-kathode.

Regarding the popular but erroneous idea that an x-ray coil should have a potential sufficient to give a spark of fifteen to thirty inches thru air, the author points out that in the old style of coils only those with high potential gave a secondary current of sufficient intensity to do good x-ray work. A properly constructed coil need not give more than an eight-inch spark, but this must be heavy, indicating an intense secondary current.

Part 2, by William A. Pusey, M. D., gives a concise summary of the results of x-ray treatment as gleaned from the literature of this subject and from his own practice, with a large number of reports of cases. In discussing x-ray burns he disputes Kienböck's statement that there is no such thing as idiosyncrasy toward x-rays. Dr. Pusey has recognized in his practice marked variations in the susceptibility of patients, amounting to a difference of four times as much in one case as in another. These differences he finds do not belong to different parts of the skin nor to its color or complexion, but to be "purely a matter of personal equation without discoverable characteristics" upon which they may be predicated. In this view he differs from most writers upon this subject, who find that these differences are due to easily discoverable factors in the patient.

Regarding auto-intoxication, of which many writers have spoken as something to be guarded against during x-ray treatment, Dr. Pusey says he has never seen

any effect that might be attributed to it. This may be due to the fact that he has usually adhered to his original form of apparatus, which is capable of producing at best only a moderate intensity of x-rays, and has probably also attended to elimination as a routine part of treatment. Such conditions of auto-intoxication undoubtedly do occur, and a number of deaths have been in all probability hastened by this result of intense x-ray treatment.

The historic references are numerous, but are neither complete nor reliable. For example, the author says, "The first report of a successful treatment of lupus vulgaris by x-rays in the United States was the very valuable report of P. M. Jones, of California, January, 1900." In the *Chicago Medical Times*, December, 1896, is the report of successful treatment of lupus by x-rays. An excellent summary of the use of x-rays in pulmonary tuberculosis was printed in the *Illinois Medical Journal* of March, 1904, by Carl F. M. Sandberg, which mentions some early work done in the United States of which no mention is made by Dr. Pusey.

The book is well bound and abundantly illustrated. It forms a valuable addition to any electro-therapeutical library.

Government and Wireless Telegraphy.

The Navy Department has decided to assume control of all the wireless telegraph stations on the coast and to prohibit the operation of such stations by private persons or corporations.

This is seemingly only a move to assure the proper defense of the sea coast of the United States. But it is really more than this. It is a step toward the national ownership of transportation. If the government may take charge of wireless telegraphy why not of other forms? Why not of railroads?

The Chicago Medical Gold Brick.

A worthy gentleman of philanthropic proclivities, a promotor who is alive to the interests of humanity—which is “I,” writ large—has discovered that Chicago is suffering from a lack of hospital accommodations. Incidentally he has discovered that there are a few persons who have escaped the net of the hospital grafter and are still foolish enough to employ physicians and pay them for their services. Bent upon remedying this deplorable state of affairs, he is now in Chicago for the purpose of organizing a “co-operative hospital run on the principle of that much to be anathematized institution, the London Medical Club. The members of the proposed co-operative hospital association are to pay a yearly “membership” fee, and the medical staff is to be “paid for its services.” The principal alleged *raison d’être* of the new scheme is the need of providing accommodations for those “too poor to pay a physician but who can pay something for hospital accommodations.” This tearful plaint of the promotor, conjoined with the “salary” argument, has enlisted the sympathies of a number of prominent medical men who, not content with the grafting that they have, are eager to fly to grafting that hitherto they knew not of.

It is to be hoped that the profession will antagonize this new scheme for imparting a veneer of respectability to dead-beatism. Should such an institution be started, the duty of the profession will be to oppose its operation in every possible legitimate way. More than this, the stamp of disapproval should be put upon every physician who connects himself with the scheme in any way whatsoever. When consultation and operation cease to travel towards such men, they may learn that the selfishness of the individual can not be permitted to obscure that spirit of pro-

fessional altruism which should imbue the spirit of every man who poses as a leader in medicine and surgery. The profession is travelling towards pauperism pretty rapidly as it is; the new scheme would be but the beginning of the end. The day is not far distant—unless conditions change and the profession awakens to the dangers that confront it—when the twenty-five-cent fee of the London Medical Club will be too close for comfort. In thus antagonizing the proposed medical gold brick scheme, I am simply following the line of procedure mapped out to the promotor who laid his plans before me and invited me to join the enterprise on a profitable basis. He asked me what attitude the Chicago Medical Society would likely assume toward the new scheme, I replied, “I do not know, but in so far as my influence will count, it will be war to the knife.” In closing I wish to remark that the co-operative hospital scheme apparently contemplates a chain of the new grafts in every large city in this country.

G. FRANK LYDSTON.

New Form of X-Light Tube.

Dr. J. Mount Bleyer, of New York City, who has for many years made a special study of light phenomena, has discovered a new composition of glass from which has been constructed an x-ray tube, which Dr. Bleyer claims may be used to generate both x-rays and the bi-ultra violet rays at the same time. The quality and richness of the rays emitted from this tube are considered by Dr. Bleyer to be the finest he has observed. The perfection of a tube of this nature will place in the hands of therapists an instrument of much value in the treatment of lupus and other allied diseases. Dr. Bleyer credits Mr. G. J. Monohan with the construction of the tube.—*Electrical Review*.

The Medico-Legal Aspect of X-Rays.

With a widening field of usefulness the medical employment of x-rays becomes a "burning question," and this in its most literal sense. It is true that, so far as the x-ray photograph—the radiograph—is concerned, improved instrumentation has so far shortened exposures that the harmful, inflammatory effect known as x-ray dermatitis, or x-ray burn, need not be apprehended. A five minutes' exposure ought to be sufficient for the most deeply lying organs of the body; and this with the tube at seven inches from the skin involves no risks—whatever be the construction and condition of the tube, the penetrating power of the rays, the number of interruptions, the size of the secondary coil, or the susceptibility of the patient. Prolonged screen examinations for renal calculus have sometimes produced burns for which damages have been claimed; but in the light of past experience such cases ought no longer to be possible. Neither ought the chronic "dermatitis of operators" ever to occur now that the necessity for suitable precautions is properly understood. But the cases that occurred (for instance, amongst hospital operators and others) before the danger was properly realized, still exist, and might constitute reasonable grounds for claim to compensation. Altogether it seems evident to those best able to form an opinion, that actions to recover damages for x-ray burns caused by "diagnostic exposures" will become very uncommon in the future. But in view of the present extensive employment of "raying" for curative purposes, the question assumes a widely different aspect. Here repeated exposures are necessary, and no care and skill, however great, can at present guarantee an absolute immunity from risk. As is well known, ten to twenty days may elapse between the appearance of the

deleterious effects and the exposure which caused them. Nature sometimes fails to hoist the danger signal until the mischief is done. But apart from this the further question arises: How far is a more or less pronounced dermatitis the usual and necessary accompaniment of cure?

It is evident that whoever undertakes the treatment of any morbid condition by x-rays, undertakes a serious responsibility. He must err neither on the side of rashness nor timidity. Especially must there be a complete understanding, perhaps even expressed in writing, that the patient is aware of the nature of the treatment, and is willing to accept its attendant risks or necessities. All this seems self-evident, yet a reference to the reports of cases that occasionally find their way into the law courts seem to show that these precautions are not always taken, and these responsibilities sometimes ignored. A case reported in the columns of this journal on May 20th, is instructive reading in this connection. Here a medical man sued the husband of the patient for payment of professional fees, and the finding of the jury was to the effect that "the defendant did not consent to the x-ray treatment, and that the treatment was improper, negligent, and unskillful." In the face of the medical evidence, it is difficult to see how any other verdict could have been returned. If the treatment was applied without the knowledge and consent of the patient's husband, it was certainly, in this sense improper. If it was deputed at one time to a layman, and at another to a nurse, it was certainly negligent, and this is a point by no means sufficiently insisted upon in the trial. That it was unskillful, seems to have been considered proved by the very extensive burning produced. Whether the medical evidence as to unskillfulness, and, indeed, other points would quite satisfy a critical observer, is,

perhaps, another question. It seemed to be the impression of at least one witness that "if h. f. currents could do no good, they could do no harm." Such a view does not accord with the experiments of Bordier and Lecompte, who have demonstrated that such currents showing on d'Arsonval's instrument a milliamperage of about 500 can kill or paralyze small animals such as rabbits. Surely, therefore, high frequency currents must have some potentialities for mischief even in man. The same critic might even go further and demur to the very dogmatic utterances of some of these witnesses with reference to the inability of x-rays to penetrate beyond the skin and to influence internal disease. Again, in view of the fact that the "mechanism" of the x-ray burn has never yet been elucidated, the same observer might be surprised to learn that such burns can be "effectually prevented." Further, the same censorious person might refer to the fact that some operators think (and they have a right to their opinion) that a certain amount of dermatitis is the more or less necessary accompaniment of cure; he might even go bluntly to ask, in his own objectionable way, how far it is proper to tell a jury that every precaution ought to be taken to prevent such effects upon the skin.

Passing from the main issue certain reflections suggest themselves bearing on the whole question. In view of all that is known on the subject, has the medical employment of x-rays really reached that measure of scientific precision that might be expected? Knowing, as we do, how to sift and separate one from another the various radiations that proceed from an x-ray tube, why is there no record of exact experiments to ascertain what is the actually harmful agent—what the actually helpful one? Consider for a moment the chief components of this compound radia-

tions: Ultra-violet rays, alpha rays, kathode or beta rays, x or gamma rays. Of these it is known that the ultra-violet have but little penetrative power—a pocket handkerchief will stop them. With ease the alpha rays may also be intercepted. Much more difficult to arrest are the kathode and the x-rays, but here we have only to remember that the former can be deflected by a magnet and thus eliminated, leaving only the x-rays. But besides these radiations, there are also to be reckoned with certain chemical or oxidizing effects, and also electrostatic effects. From the latter the skin can easily be protected by various devices, such as an earthed aluminium screen. The ionizing, or oxidizing, effect requiring, as it does, the presence of oxygen, might presumably be eliminated, as suggested by Sir Oliver Lodge, by employing an atmosphere of hydrogen, or applying a tightly fitting cover to the part, or in other ways.

It thus becomes evident that whatever be the deleterious or burning agent it can theoretically be eliminated. But again crops up the ever-recurring question—is this elimination desirable? Can we do without the effect in question? This chemical, or ionizing, or oxidizing action of the ray upon the air in contact with the tissues may be the cause of the burn; but there is, at least, an equal possibility that this very same chemical effect is the active agent in the destruction of the morbid growth. Such a hypothesis might help to explain the destructive effect of raying upon surface growths, its failure to influence the deeper tissues (which it certainly penetrates) being ascribable to the absence of oxygen; and those burning effects sometimes seen on the skin at the side ~~most~~ distant from the incidence of the rays might similarly be accounted for. Given the co-operating presence of oxygen, the x-ray might be able to influence

even deep-seated tumors; and it is quite possible, as suggested by Sir Oliver Lodge, that, before long, we may find ourselves working on these lines.

What can be said of radium in this connection? Although the egregious claims and irresponsible statements that quickly followed on its first discovery have now, happily, given place to sober judgment and sound work, it can not be said that much has hitherto been accomplished by the medical employment of radium. It is not exempt from the risks of the x-ray, but it certainly presents considerable facilities for application in certain difficult positions, and its gamma

rays doubtless excel the x-ray in penetrating power. But then, again, as already insisted on, mere penetrating power is not all that is required; the x-ray has penetrated many a morbid growth, which, nevertheless, it has proved powerless to influence. Practical experience must be accumulated; we must be content to watch and wait and work with an open mind. But, in the meantime, unless it can be proved that radium can do something more than cure a rodent ulcer, it can not claim superiority, or even equality in a comparison with the radiations of the focus tube.

—*London Electrical Review.*

Electro-Culture.

An interesting and at the same time an encouraging renaissance has lately been observed in various parts of Europe. This is the movement that has lately taken place, after many years of neglect, in favor of the application of electricity to agriculture, not only in the driving of all kinds of agricultural machinery, including the plow, but also in the influence brought to bear by electricity itself on vegetation and germination. In France quite recently the minister for agriculture sent to prefects and sub-prefects a circular instructing them to facilitate in every possible way the application of electricity to agricultural operations, and setting forth the advantages that agriculture and industry in general would derive therefrom. In Belgium still further progress has been made, as the interesting question of electricity in agriculture has been introduced into the university curriculum. The minister for agriculture has found the subject of sufficient interest for him to commission M. Guarini to devote to it, at the Agricultural Institute at Gembloux, a series of lectures on the ques-

tions we are about to enumerate.

We will not go into the description of the numerous experiments shown by the lecturer, nor into the contradictory results obtained by experimentalists in different countries. As to the latter, we will merely remark that the products obtained by electro-culture are very abundant, very fine and very quickly matured. We will confine ourselves to the ideas put forward by M. Guarini, with special regard to his theories for the chemical and mechanical explanation of the satisfactory results obtained by the application of electricity to vegetation. For the last forty years, particularly since the researches of the German scientist, Sachs (1865), our ideas with regard to vegetable physiology have been fairly definite. We can now easily explain to ourselves the function of each part of the plant, the *raison d'être* of each organ and of its form. Moreover, we know a great deal about the function of chlorophyll, in particular of what it consists and what it requires to stimulate its production and to render it more active.

But on the other hand we are completely in the dark as to how and by what means carbonic acid is decomposed in chlorophyll into carbon and oxygen.

M. Guarini asks whether, in these days, where so many things are explained by electricity, we are not justified in thinking that plant life also is based on electrical phenomena; he asserts that this is so. In the first place, he remarks that, contrary to what is believed and taught, it is not electricity that can be substituted for light in certain cases in the accomplishment of the function of chlorophyll, but the light of the sun and of arc lamps, with its electrical radiations, that can be substituted for purely electrical treatment. We have the best proof of this statement in the following experiment:

A plant placed in a pot which is inclosed in a metal cage (a Faraday cage) dies, altho it is exposed to the sunlight. This, says M. Guarini, is because the plant is deprived of the *indispensable* influence of atmospheric electricity, and particularly of the electric radiations of the sun. On the other hand, if a plant is placed in absolute darkness it can produce much finer and more abundant fruit in less time than under natural conditions if judicious electrical treatment is applied to it. With regard to the experiment with the Faraday cage, for the plant to die it must be in a pot completely surrounded by the metal cage. When the plant is in the earth, altho we suppress the influence of the solar radiations and of the current going from the atmosphere to the earth, we do not completely suppress that which passes from the earth to the atmosphere. Every time it rains, hails or snows, for instance, the potential of the earth changes from its usual negative nature to positive.

M. Guarini reminds us that in the Faraday cage we have no charge inside if we have one outside, but we get one outside if we have one inside. When a plant is placed in the earth and surrounded by a metal cage it does not completely perish, but, as Messrs. Grandeau and Leclerc's experiments have shown, there is a diminution of 50 to 70 per cent in the leaves and stalks, and 50 to 60 per cent in the seeds and fruits, as compared to what it bears when there is no cage.

After this introduction, M. Guarini explains as follows the influence of electricity on the principal vital functions of the plant, i. e., nutrition, respiration, and transpiration.

NUTRITION.

1. *Aerial Nutrition.*—The current which passes through the plant from the atmosphere to the earth, or vice versa, decomposes the carbonic acid in the chlorophyll into carbon and oxygen. M. Guarini then performs the following experiment: He injects carbonic acid into a vessel of water from which proceed two electrodes connected with a current of 110 volts. There is at once a deposit of carbon on one of the electrodes. He announces, moreover, that he has obtained formic aldehyde in collaboration with Dr. Samarani of the Agricultural Institute at Gembloux. Special conditions of voltage and amperage are required for this. All this is perfectly in accordance with the experimental results obtained by the Russian Walther in his experiments on the synthesis of sugars by electrolysis, in which the original material consisted of carbonic acid.

2. *Nutrition in the Earth.*—The currents which pass through the earth whether natural (earth currents) or artificial (generated by batteries, accumula-

tors, dynamos, etc.), decompose the chemical substances found in the earth or added to it in order to form nourishment more easily assimilated by plants.

3. *Distribution of Aliments.*—Mr. Guarini pointed out that in arc lamps on the one hand, and electrolysis on the other, material was conveyed from the positive to the negative pole; he also referred to the experiments of Prof. Lemström, of the University of Helsingfors, who was able to make water rise in a capillary tube immersed in a basin, in which was placed the positive pole of a static machine, the negative pole of which was connected with a point touching the upper part of the capillary tube. When, therefore, the potential of the earth is positive, or rendered so artificially, and the potential of the atmosphere is, above the plants, rendered negative, the current which goes from the earth to the atmosphere draws with it the water and alimentary substances, i. e., promotes the circulation of the sap.

RESPIRATION.

This means the inhalation of oxygen through the pores of the capillary vessels. When there is a current passing from the atmosphere to the earth, the oxygen is carried along in the direction of the current—i. e., downward—and is driven out with more or less force through the pores, and thus respiration is kept up.

TRANSPIRATION.

This consists in the plant giving off the products of combustion, carbonic acid and aqueous vapor. When there is a current passing through the plant in an upward direction, the result is contrary to what takes place in respiration—i. e., the current drives the gases of combustion out of the pores.

To all these chemical and mechanical effects must be added another of considerable importance. Prof. Lemström shows

that when a high-tension electric current is applied to plants, there is produced ozone in large quantities, nitric acid, nitrous acid, and, perhaps, ammonia. Now, we know that the oxygen derived from the ozone is highly active, as is shown by the increased verdure of plants after a storm. From what M. Guarini says, it follows that for respiration the plant must be traversed by a current going towards the earth, whereas for transpiration the current must go towards the atmosphere, whilst in the case of nutrition the direction of the current is immaterial. As nutrition and respiration are the two most important functions of plant life (transpiration being a consequence of these two functions), it follows that the best result is obtained when the plant is traversed by a current going towards the earth, which would correspond to the normal electric condition of the atmosphere and the earth. Mr. Guarini, in order to prove that experiment agrees with theory, showed photographs obtained by Prof. Lemström during his experiments with a static machine of his own invention. With the aid of these photographs one can see and compare the results obtained from carrots, the layer of atmosphere surrounding them having been electrified (1) positively, (2) negatively, (3) positively and negatively, and (4) not electrified at all. When the atmosphere is electrified negatively, i. e., when there is a current towards the atmosphere, the carrots are better than when there is no electrical treatment.

In this case, as we have said, there is increased activity of nutrition and transpiration. The results are incomparably better when the atmosphere is electrified positively, i. e., when the current goes towards the earth. In this case, we not only force respiration and nutrition into

greater activity, but—and this is most important—we send into the plant a greater quantity of carbonic acid, i. e., a greater quantity of nourishment.

The illustration presented by the lecturer also showed that very deplorable results were obtained when currents of both kinds were applied.

Finally, the lecturer remarked that in order to derive the greatest benefit from electrical treatment it is necessary: (1) to place the plant in an environment where there is much more carbonic acid than in the atmosphere. This can easily be done in glass houses that are entirely closed; (2) to accustom the plants, perhaps, after a certain number of generations, to forced alimentation, transpiration and respiration, and so to a much more rapid mode of life.

By these methods and by judicious electrical treatment, production can be pushed to extreme limits, and several crops a year obtained.

As to the sources required for the electrical treatment, M. Guarini mentions the three following:

1. Atmospheric electricity. None of the arrangements employed completely answer the purpose required. The sources of the atmospheric currents must be placed in much higher positions than they have yet been, so that there may be sufficiently high differences of potential between the top of the rods and the earth, and sufficient to overcome the resistance of the plants and of the layer of air separating the lower part of the rods from the plants, that part of the air in which currents are produced and consequently ozone.

2. Static machines. He rejects these for the present as expensive and delicate toys, easily put out of order, and incapable of producing the intense effects required.

3. High-tension continuous-current dynamos; these are both inexpensive and strong. By using them instead of atmospheric electricity, the electrical treatment can be regulated at will.

M. Guarini mentioned in this connection that the Société des Industries Electriques et Mécaniques, of Geneva, has recently brought out a continuous-current dynamo capable of giving one ampere at 23,000 volts, and that by coupling three of these machines in series, the high figure of 69,000 volts is obtained, a value more than sufficient for electro-culture.

Lastly, he concludes that plant life is an electrical phenomenon which can be regulated at will. The farmer will no longer be a mere machine, but a skilled and more or less intelligent electrician, who, like an engine driver, will direct from a board at the farm the germination and growth of his carrots, potatoes and cabbages.—*London Electr. Rev.*

New Theory on Polar Currents.

The latest word in meteorology is brought from the international meteorological committee, which will render it necessary, it is said, to abandon once for all the theory hitherto adopted of a vertical circulation of the atmosphere between the tropics and the poles. Dr. H. H. Hildebrasson, who makes a report, expresses the hope that the terms "polar" and "equatorial" currents, which have hitherto caused so much confusion in dynamical meteorology, will disappear completely from meteorological science.

He shows that in all parts of the temperate zone of the northern hemisphere an and upper current from west to east prevails in all months of the year, while in the tropical zone the currents at all heights are almost without exception from east to west.

Experts on Cancer.

Important conclusions in connection with cancer were announced when the Prince of Wales presided at the annual meeting of the general committee of the cancer research fund. Distinguished experts briefly summed up their year's work as follows:

Civilization is not the cause of cancer, which pervades animal as well as human life and attacks all its subjects at relatively the same age and periods.

Cancer is not an infectious disease and is not transmissible from one species to another. A cancer cell can reacquire powers of self-propagation.

Cancer is not caused by a parasite.

The malady is not on the increase.

Radium has been found to exercise no curative effects.

A serum has been discovered from which good results are hoped.

The first authentic cases of cancer in animals were minutely described by experiments which had been made on fish and wild mice.

The Prince of Wales urged the public to consult the surgeons at the first indication of any cancerous symptoms, though the report of the experts said that no sign has yet been discovered by which medical men can surely recognize the presence of cancer.

More Surprising Properties of N-Rays.

In addition to the other surprising properties of n-rays, it is now stated by well known scientific men that n-rays—or, rather, those substances which have the property of emitting these rays—are affected by anesthetics. A statement to this effect was made recently by Meyer, who found that plants subjected to chloroform lose their power of emitting n-rays. His work has been carried further by Becquerel, who has investigated the influence

of anesthetics on other sources of this surprising form of radiation. He found that several inorganic sources of n-rays lose temporarily their power under the action of chloroform, ether, or nitrous oxid. These experiments raise the question whether the emission of n-rays is a fundamental vital process. If so, where lies the dividing line between organic and inorganic bodies? In view of other investigations of a somewhat similar character, altho along an entirely different line of research, this topic is becoming of increasing interest.—*Electr. Review.*

Cancer Research Abandoned.

That the researches in regard to the etiology of cancer have failed miserably is a melancholy fact, but true nevertheless. We are as much in the dark in regard to the cause of this dread disease as we ever were. The New York Senate Committee on Finance has, after spending \$100,000, refused to appropriate any more money for the maintenance of the Buffalo Cancer Laboratory, asserting that nothing could be shown for the money expended.—*Georgia Medical Journal.*

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